Saskatchewan
Agriculture
and Food

FINAL REPORT

Agriculture Research Branch
Saskatchewan Agriculture, Food & Rural Revitalization

20010164

ASSESSING THE INFLUENCE OF VARIETY, LOCATION AND AGRONOMIC PRACTICES ON FIBRE CONTENT IN OILSEED FLAX

Funded by
Technology Adoption Demonstration

September 2002
Prepared by: Biolin Research Inc.

Biolin RESEARCH INCORPORATED

August 6, 2002

Jennifer Hume
Industry and Resources
Agricultural Development Fund
3rd Floor, 2103 11th Avenue
Regina, SK
S4P 3V7

Dear Jennifer,

Re: TAD 1 Project 20010164 – "Assessing the Influence of Variety, Location, and Agronomic Practices on Fibre Content in Oilseed Flax"

Once again thank you for your co-operation to date regarding this project. Please find attached the final brief summary of this project's activities, output, personnel, and expenditures according to the headings shown in Appendix "B" of the original contract for this project.

Yours Sincerely,

Alvin Ulrich

Alvin Ulrich

103 – 110 Research Drive • Saskatoon • Saskatchewan • S7N 3R3 • (306)668-0130 • (306)668-0131

Brief Summary of Project Output, Personnel and Expenditures

(a) Summary

An abstract of the project has been written and placed on a separate page of the technical report.

(b) Technical Report

One hard copy of the final report has been enclosed and a CD with an electronic version has also been enclosed.

d) Equipment

No equipment has been purchased or rented with project funds.

e) Project Developed Materials

No labels, poster, or brochures have been developed to date but several are planned in the future that will include information gathered from this research project. A PowerPoint presentation has been prepared that summarizes the goals, results and funding sources for this project. It has already been presented to several groups and will be presented at several conferences this fall.

f) Project Photos

No photos were taken of this project because we already have on file photos from projects that had similar plots and/or activities.

g) Acknowledgments

Final reports and presentations prepared from the results of this project will acknowledge the financial support given to it by Saskatchewan Agriculture, Food and Rural Revitalization.

j) ICAR Data Entry

We are attaching a printout of the entry we have made in the ICAR database.

Project Report

Click on the field name hyperlink to update or add information. Once completed, click on the "Back to Project List" button located at the bottom of this page. Click on the "Terminate Project" button if your project is no longer active. Click Help for further information.

ICAR-ID: 33330927

Title: **Assessing the Influence of Variety, Location and Agronomic Practice on Fiber Content in Oilseed Flax (Linum usitatissimum) in Saskatchewan in 2001**

Project Number: TAD 1 - 20010164 **Language:** E

Start Date: 2001/05/14 **Expected End Date:** 2002/07/31

Research Establishment: BIOLIN RESEARCH INC.

103 - 110 Research Drive

Saskatoon, Saskatchewan

S7N 3R3

Contact: ULRICH, ALVIN **Tel:** 306-668-0130 **Fax:** 306-668-0131

E-Mail Address: aulrich@biolin.sk.ca

Web Address:

Key Code Pairs:

- PLANTS, OILSEED CROPS AND PRODUCTS, FLAX (01020500)
- PLANT/CROP MANAGEMENT (40000000)
- PLANTS, OILSEED CROPS AND PRODUCTS, FLAX (01020500)
- PLANT/CROP MANAGEMENT, VARIETIES, TESTING AND RECOMMENDATIONS (40030100)
- PLANTS, OILSEED CROPS AND PRODUCTS, FLAX (01020500)
- PLANT BREEDING/REPRODUCTION, GENETIC VARIATION, YIELD CHARACTERISTICS (47030200)

Keywords:

- Content
- Fiber
- Nitrogen, fertilizer
- agronomic
- bast

103-02059/

- fibre
- flax
- location
- seeding date
- **seeding rate**
- straw
- variety

Staff:

Name	Role	Project PY
TECH	TECHNICAL STAFF	01.51
ULRICH, ALVIN	PROJECT LEADER	00.18

Cooperating Establishments: UNIVERSITY OF SASKATCHEWAN, CROP DEVELOPMENT CENTRE, 51 Campus Drive, Saskatoon, Saskatchewan, S7N 5A8

AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, INDIAN HEAD RESEARCH CENTRE, Indian Head, Saskatchewan, Indian Head, Saskatchewan, S0G 2K0

Funding Sources: SASKATCHEWAN DEPARTMENT OF AGRICULTURE AND FOOD, TECHNOLOGY ADOPTION AND DEMONSTRATION FUND, Walter Scott Building, 3085 Albert Street, Regina, Saskatchewan, S4S 0B1

Objectives: To improve our understanding of the relationship between fiber content and variety, location, date of seeding, rate of seeding and amount of nitrogen fertilizer so that farmers and straw processors can alter their management practices to increase their chance of producing profitable flax fiber based industries in Saskatchewan.

Status/Progress Report: Many of the locations experienced the driest weather in the last 100 years and hence plant height, seed yield and fiber content were much lower than normal. There were statistically significant differences between most of the locations and often between varieties at the same location. Some agronomic practices had significant effects on fiber content.

Impact of Research: We do not know how much bias and misleading information was generated by the dry conditions since we have only one year's data to analyze. Varieties and agronomic practices often influence fiber content and hence farmers can influence fiber content of oilseed flax by changing their management practices. Given such a wide range of fiber contents, it is obviously very important for processors of flax straw to be able to pick and choose only straw that has superior fiber content.

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Project List

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Please note that the Update Status remains blank until the project is reviewed.

List of projects available for Randy Cowan

ICAR ID	Project Title	Contact Name	Update Status
33330927	Assessing the Influence of Variety, Location and Agronomic Practice on Fiber Content in Oilseed Flax (Linum usitatissimum) in Saskatchewan in 2001	ULRICH, ALVIN	Submitted

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Assessing the Influence of Variety, Location and Agronomic Practice on Fiber Content in Oilseed Flax (*Linum usitatissimum*) in Saskatchewan in 2001

Final Report

Biolin Research Inc.

Submitted to
Saskatchewan Agriculture, Food and Rural Revitalization
Regina, CANADA

July, 2002

RES. TAD 1

Project: 20010164

Project Title: Assessing the Influence of Variety, Location, and Agronomic Practices on Fibre Content in Oilseed Flax

Biolin Research Inc. would like to gratefully acknowledge the financial support given by the TAD program of Saskatchewan Agriculture, Food and rural Revitalization and would like to thank the staff of CDC and AAFC, Prem Sharma, Tim Fluter, Kevin Simons and especially Randy Cowan, for their efforts in helping to successfully complete this project.

Assessing the Influence of Variety, Location and Agronomic Practice on Fiber Content in Oilseed Flax (*Linum usitatissimum*) in Saskatchewan in 2001

Alvin Ulrich

Biolin Research Inc., 103 – 110 Research Drive, Saskatoon, SK S7N 3R3 Canada
1-306-668-0130, aulrich@biolin.sk.ca

Executive Summary

Background
Farmers in Saskatchewan seed 350 to 450,000 ha of oilseed flax every year to produce seed for export. Between 800 to 1,200 kg/ha of straw could be collected after the seed is harvested. Only 10-15% of this straw is collected and used in the manufacture of specialty papers and plastic components. The flax straw that is not removed from the field, for these uses, is normally burnt or chopped and spread. Unfortunately burning has negative environmental impacts and chopping and spreading is an economic cost.

Recent market surveys and on-going research indicate that there are many potential products that could utilize flax fibers to compliment or replace glass, synthetic and cotton fibers. If flax fibers were used more extensively in such products, it would increase the demand for flax straw, reduce the amount of flax straw that is burnt, and increase farmers' income from growing flax, however, processing this straw into industrial-grade fiber is not always profitable because of variations in fiber content. The objective of this study was to begin an assessment of the factors that are influencing the fiber content in flax straw in Saskatchewan. This information is needed to help farmers, processors, flax breeders and potential investors profitably grow and process flax fiber in the province.

Objectives

In September of 2001, Biolin Research Inc. ("Biolin") received funding from the Saskatchewan Agriculture and Food TAD Fund to:

1. Compare the fiber yielding ability of sixteen oilseed flax varieties at locations that were used as regional trials by the Crop Development Centre in the year 2001;

2. Compare the fiber yielding ability of three flax varieties planted at three different rates, two different seeding dates, with three different N treatments at locations that were used as agronomic trials by Agriculture and Agri-Food Canada in the year 2001;

3. Give producers, processors, breeders and potential investors the information they require to create profitable flax fibre based industries in Saskatchewan, and

4. Better quantify the relationship between fibre content and variety, agronomic practice and location in oilseed flax varieties.

Experimental Methods

Over 1,000 straw samples were collected from 14 widely separated research plot locations. At each variety test location, each of 16 varieties was planted in three randomized replicated plots and at each agronomic test site, each agronomic treatment was replicated three times. Straw from each plot in each trial was pulled out of the ground by hand after the seed was harvested. From each straw sample collected, a sub-sample bundle of straw 4.0 cm in diameter was selected. Each sub-sample bundle was then cut 10.0 cm above the ground level mark and 19.0 cm higher up resulting in bundles that were 19.0 cm in length. After cutting, each sub-sample was weighed and then was retted in a warm water tank for four to six days until the results of the "Fried Shake Test" showed that the majority of bundles were optimally retted. The bundles were then taken out of the tank, rinsed, and set in racks to dry. The fiber was then extracted from each dried, retted, sub-sample using a reciprocating blade-type breaker/decorticator. The fiber was hand cleaned to the point where few or no shives were left. After cleaning, the fiber was weighed. The percentage of bast fiber in the straw was calculated by taking the clean fiber weight, dividing by the weight of the unretted straw and multiplying by 100.

Results and Discussion

Many of the locations experienced the driest weather in the last 100 years and hence plant height, seed yield and fiber content were much lower than normal. There were statistically significant differences between most of the locations and often between varieties at the same location. Some agronomic practices had significant effects on fiber content.

Conclusions and Impact

We do not know how much bias and misleading information was generated by the dry conditions since we have only one year's data to analyze. Varieties and agronomic practices do often influence fiber content and hence farmers can influence fiber content of oilseed flax by changing their management practices. Given such a wide range of fiber contents, it is obviously very important for processors of flax straw to be able to pick and choose only straw that has superior fiber content.

Assessing the Influence of Variety, Location and Agronomic Practice on Fiber Content in Oilseed Flax (*Linum usitatissimum*) in Saskatchewan in 2001

Alvin Ulrich

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Abstract

Bast fiber content of straw from 16 oilseed flax varieties was compared at eleven sites in Saskatchewan in 2001. Three other sites with varied seeding dates, seeding rates and fertilizer rates were also included with the comparisons. Due to the unusually dry weather, there were large statistically significant differences among some locations. In some cases variety and agronomic practice had a significant effect on fiber content.

Technical Report

Background and Objectives

Background

Farmers in Saskatchewan seed 350 to 450,000 ha of oilseed flax every year to produce seed for export. Between 800 to 1,200 kg/ha of straw could be collected after the seed is harvested. At present only 10-15% of this straw is salvaged and used in the manufacture of specialty papers and plastic components. The flax straw that is not removed from the field, for these uses, is normally burnt or chopped and spread. Unfortunately burning has negative environmental impacts and chopping and spreading is an economic cost.

There is increasing interest in utilizing the flax straw that is presently uncollected. Recent market surveys and on-going research indicate that there are many potential products that could utilize flax fibers to compliment or replace glass, synthetic and cotton fibers. If flax fibers were used more extensively in such products, it would increase the demand for flax straw, reduce the amount of flax straw that is burnt, and increase farmers' income from growing flax, however, processing this straw into industrial-grade fiber is not always profitable because of variations in fiber content. The objective of this study was to begin an assessment of the factors that are influencing the fiber content in flax straw in Saskatchewan. This information is needed to help farmers, processors, flax breeders and potential investors profitably grow and process flax fiber in the province.

Objectives

In September of 2001, Biolin Research Inc. ("Biolin") received funding from the Saskatchewan Agriculture and Food TAD Fund to:

1. Compare the fiber yielding ability of sixteen oilseed flax varieties at locations that were used as regional trials by the Crop Development Centre in the year 2001;

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3. Give producers, processors, breeders and potential investors the information they require to create profitable flax fibre based industries in Saskatchewan, and

4. Better quantify the relationship between fibre content and variety, agronomic practice and location in oilseed flax varieties.

Experimental Methods

- During harvest, the cutting bar of the plot harvester was raised such that it just cut below the seed bolls. This was done to try and maximize the length of straw left standing to obtain an indication of the maximum yield of straw that could be obtained if flax was "straight cut" instead of being swathed.

- Straw was pulled out of the ground by hand after cutting with the plot harvester. The straw was pulled from areas randomly selected from portions of the plot that appeared to be of average height and density. After the straw was pulled it was put inside labeled cardboard rolls or paper bags and put into storage.

- From each straw sample collected, a sub-sample bundle of straw 4.0 cm in diameter and of varying lengths was taken. After bundling, each sub-sample was bound with two elastic bands and tagged with a plastic-coated label.

- Each trial was retted separately in a warm water tank for four to six days until the results of the "Fried Shake Test" showed that the majority of bundles were optimally retted. This test involved placing fifteen pieces of retting straw, each approximately 10.0 cm in length, each from a different bundle, in fifteen test tubes half full of boiling water with one piece of straw in each test tube. The test tubes were stoppered and placed in a machine designed by Biolin Research to violently shake test tubes for fifteen seconds. After shaking, the straw in each test tube was visually scored for loose fibers on a whole number scale from "0" to "3" with "0" representing no loose fibers and "3" representing total loosening of all bast fibers on the stem. When the average score was above 2.8 and there were no "0" scores and at least twelve test tubes had a score of "3", the bundles in the batch were considered fully retted. The bundles were then taken out of the tank, rinsed in tap water and set in drying racks, next to heater fans, for approximately four days to dry.

- Dry bundles were weighed and the fiber was extracted using a reciprocating blade-type breaker/decorticator. The fiber was hand cleaned to the point where few or no

shives were left. After cleaning, the fiber was weighed and placed in separate sample bags and labeled with a catalog number.

- Data from the above trials was entered into Excel spreadsheets, sorted and analyzed for statistically significant results using regression analysis with binary variables.

- A report was written summarizing what was done and what results were obtained

Results and Discussion

Appendix A contains printouts of the regression equations that were selected as being those that best made use of the data that was generated by these trials and that show which explanatory variables, if any, have a statistically significant impact on straw and bast fiber yield.

Straw from Variety Trials

- Trials were planted at 12 sites but the site at Elrose received so little rain that after the seed was harvested, there was no straw to salvage. (The funds not used to process the Elrose straw samples were used to process additional flax straw samples from an agronomic trial done at Brandon). In total, 528 straw samples were analyzed (16 varieties with 3 replicates at 11 sites).

- Only five sites had straw that had fiber contents that were approaching a normal level (15 – 25%) and even these were somewhat lower than expected (13 – 17%). These sites were Assiniboia, Nipawin, Battleford, Carlyle and Wynyard.

- We do not know how much bias and misleading information was generated by the dry conditions since we have only this year's data to look at and analyze.

- There were often statistically significant differences between varieties that had lower and higher fiber content and hence selecting varieties with higher fiber content will likely produce straw with high fiber content under large field conditions.

- Several varieties exhibited superior fiber content in the majority of crop zones (e.g., Linola 1084, Taurus, Emerson - see Equation 20 to Equation 23) while a few varieties had superior fiber content in only one or two crop zones (e.g. CDC Valour in Area 2, AC Watson in Area 2 and Area 4 - see Equation 21 and Equation 23).

- Conversely some varieties exhibited relatively low fiber content in the majority of locations (e.g., FP1096 and Bethune - see Equation 12) while some had very low fiber in only a couple zones (e.g., Arras, Lightning and Normandy - see Equation 20 to Equation 23).

- When the results of different locations were combined by putting all the results from locations in a particular Crop Production Area together and expressing the

fiber content as an index number (see Table 1) they showed that in Area 1 (brown soil zone) the highest fiber content variety had a fiber content that was 33% (i.e., 108/81) greater than the lowest fiber content variety. Similarly in Area 2 (dark brown soil zone) the highest fiber content variety had a fiber content that was 47% (i.e., 119/81) higher than the lowest fiber content variety. In Area 3 the most superior was 40% (i.e., 105/75) higher than the lowest (See Table 1) and in Area 4 the most superior was 61 % (i.e., 121/75) higher than the lowest. These differences are much larger than we commonly see in differences between seed yields of oilseed flax varieties. Hence, variety selection would often appear to have a very large influence on the fiber content in oilseed straw.

- There were statistically significant differences between most of the locations in this study. This could be due to very different weather patterns among locations as well as differences in soil fertility. In a regression that combined the results of all eleven locations, every location was statistically different (See Equation 13). The four highest average fiber contents were at Assiniboia (17.2%), Nipawin (16.8%), Battleford (15.9%) and Carlyle (14.5%), while the four lowest fiber contents were at Kernen (3.6%), Kelvington (7.8%), Girvin (10.8%) and Shellbrook (10.9%). Hence the average fiber content of the best location (Assiniboia) was 4.8 times greater at the worst location (Kernen) and the four best sites had an average fiber content that was 1.9 times greater (i.e., almost double) the fiber content at the four worst sites. With such great differences in fiber content, it is obviously very important for processors of flax straw to be able to pick and choose among locations and/or be able to store high fiber content straw over several seasons (assuming weather plays a large role in determining fiber content and hence that a particular location that produces low fiber content straw in one year will not necessarily produce low fiber content straw the next year).

Straw from Agronomic Trials

- Straw was collected from Morden, Indian Head and Melfort. At each site three oilseed flax varieties (McDuff, Norlin and Valour) were grown in three randomized replicates and received different agronomic treatments. These included three rates of nitrogen (67%, 100% and 133% of recommended N), three seeding rates (22 kg/ha, 45 kg/ha and 67 kg/ha), and early and late seeding. In addition we were able to use unspent funds from a variety trial location that we could not collect straw from, to collect and process the McDuff straw from a similar agronomic trial at Brandon.

- When data on fiber content were combined from all sites, there were statistically significant differences between all locations (See Equation 29) with average regression yields at Brandon being 17.7%[1], Morden at 15.1%, Melfort at 14.4% and Indian Head at 9.1 %. The only other variable that was statistically

[1] This is slightly higher than the average regression fiber content of 17% when only Brandon data is used in regression equation.

significant when all data was combined was the low seeding rate which lowered the average fiber from 17.7% to 16.8%.

- Combining all data from all locations can easily mask some effects; hence it is also advisable to look separately at results at different locations.

- At Brandon, no significant statistical results emerged (see Equation 25); this is probably because there were no replicates and the sample size was relatively small.

- At Indian Head, McDuff had significantly lower fiber content than Valour or Norlin and early seeding produced straw with less fiber (8.3% instead of 10.8%) (See Equation 26).

- At Melfort Norlin had significantly higher fiber content than Valour and McDuff (See Equation 27); low seeding rates produced significantly less fiber (13.4% instead of 14.9%) and early seeding produced significantly less fiber (12.8% instead of 14.9%).

- At Morden, early seeding gave significantly higher fiber content (17.0% instead of 12.7%) (See Equation 28) ands the low seeding rate gave significantly lower fiber content (12.0% instead of 12.7%).

- These statistically significant results are in general agreement with the results from the straw analyzed from the variety trials in that they show that a variety with superior fiber content in one location does not always show superior fiber content at other locations. They also show that low seeding rates often have a significant effect on lowering the fiber content. The effect of early seeding is not clear since it shows a strong negative or positive effect on fiber content. It is suspected that the actual effect is largely due to the subsequent weather patterns during the growing season[2].

- Most of the treatments did affect fiber content, however, the results were not statistically significant (i.e., they could have easily happened by chance). Nevertheless, most of these effects were similar at each location and hence offer important insights into agronomic practices which affect fiber content. These are summarized below. Data from more years of trials at more locations are needed to show if these results are truly significant or if they happened just bu chance in 2001.

  67% N – Increased fiber content at 3 of 4 sites; no effect at 4th site.
  133% N – decreased fiber content at 3 of 4 sites; slight increase at 4th site.

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[2] It is hypothesized that temperatures over 28 ° Celsius 30 – 60 days after seeding, when the flax plant is "bolting" and/or during the last 10 – 15 days before seed maturity when the fiber lumens are filling negatively affect fiber content but more investigation of this is needed.

67 kg/ha seeding rate – increased fiber content at 4 of 4 sites; and
22 kg/ha seeding rate – decreased fiber content at 4 of 4 sites.

- Previous analysis of fiber content of oilseed flax varieties of flax at the Plant Genetic Resources Canada in 1998 and 1999, indicated that the fiber content of the three varieties used in this trial (i.e., McDuff, Norlin, and Valour) are all in the low to medium range of fiber contents for oilseed flax varieties grown in Western Canada. This may partly explain why agronomic responses appear relatively muted.

Conclusions and Impact

Conclusions

Table 1 was created by putting locations into their respective Crop Production Areas (i.e., soil zones) and then running regressions on the combined data from each Crop Production Area. The regression coefficients for each variety were then used to calculate the average fiber content for the variety in question. These average fiber contents were then converted to an index number which shows the fiber content of a given variety relative to the fiber content of Vimy, which was given an index of 100 (See Table 1). Hence in Area 4 where Bethune has an index of 75, it means that the fiber content of Bethune was 75% as high as that of Vimy.

Impact

These results indicate that agronomic practices do often influence fiber content and hence that farmers can influence fiber content by changing their management practices. However, more years of data and testing at more locations is warranted to build confidence in estimating the actual magnitude of such effects. In addition, date of seeding appears to have a large and significant effect on fiber content. More research is needed to understand why this is so and to understand how farmers can use this information to their advantage. Given such a wide range of fiber contents, it is obviously very important for processors of flax straw to be able to pick and choose only straw that has superior fiber content.

Acknowledgements

Biolin Research Inc. would like to thank Saskatchewan Agriculture, Food and Rural Revitalization for the financial support it received from the TAD program to carry out this study. It would also like to thank the staff of the Crop Development Center who were in charge of the oilseed flax regional variety trials and to staff at Agriculture and Agri-Food Canada who were in charge of the oilseed flax agronomic trials. Cooperation from these two institutions was very necessary and very thankfully received. Lastly but most importantly we acknowledge the great efforts made by Randy Cowan and other staff of Biolin Research Inc. who collected and processed all the straw and fiber and hence made all the technical analysis possible.

Table 1 – Fiber Content Index of Varieties

	---Fiber Content Index			
Variety	**Area 1**	**Area 2**	**Area 3**	**Area 4**
Vimy	100	100	100	100
CDC Arras	94	95	90	88
CDC Bethune	90	96	88	75
AC Carnduff	103	111	98	111
AC Emerson	101	114	100	109
Flanders	104	104	93	96
FP1082	101	93	98	97
FP1094	98	107	86	92
FP1096	91	81	75	88
AC Lightning	92	101	78	90
CDC Normandy	91	109	84	98
Taurus	100	111	103	105
CDC Valour	81	119	91	90
AC Watson	99	116	92	102
Solin				
Linola™ 989	93	106	91	105
Linola™ 1084	108	108	105	121

Table 1 – Fiber Content Index of Varieties

	---Fiber Content Index			
Variety	**Area 1**	**Area 2**	**Area 3**	**Area 4**
Vimy	100	100	100	100
CDC Arras	94	95	90	88
CDC Bethune	90	96	88	75
AC Carnduff	103	111	98	111
AC Emerson	101	114	100	109
Flanders	104	104	93	96
FP1082	101	93	98	97
FP1094	98	107	86	92
FP1096	91	81	75	88
AC Lightning	92	101	78	90
CDC Normandy	91	109	84	98
Taurus	100	111	103	105
CDC Valour	81	119	91	90
AC Watson	99	116	92	102
Solin				
Linola™ 989	93	106	91	105
Linola™ 1084	108	108	105	121

Appendix A

The following pages show the results that were obtained when regressions were run using the regression function packaged with the Excel Spreadsheet Program. For reference purposes, each equation was given a separate number and a short description of what the dependent variable in the equation was. In the result sections, lines that are in bold text indicate that the result is significantly different at the 95% confidence level. It should be noted that the regression function that is packaged with the Excel Spreadsheet Program is limited to 16 explanatory variables. This means that, in some cases, all possible explanatory variables could not be included. In these cases, we tried different combinations of 16 variables, to find the set that appeared to have the best explanatory power.

Crop Development Centre – Regional Variety Trials

Equation 1 - ASSINIBOIA01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.53
R Square	0.29
Adjusted R Square	(0.05)
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	0.85	0.62
Residual	32.00	0.02	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	17.8%	0.01	13.48	0.00	0.15	0.20	0.15	0.20
Linola™ 1084	1.5%	0.02	0.79	0.44	(0.02)	0.05	(0.02)	0.05
Flanders	0.8%	0.02	0.40	0.69	(0.03)	0.05	(0.03)	0.05
AC Carnduff	0.5%	0.02	0.29	0.77	(0.03)	0.04	(0.03)	0.04
AC Emerson	0.2%	0.02	0.12	0.91	(0.04)	0.04	(0.04)	0.04
FP1082	0.1%	0.02	0.06	0.95	(0.04)	0.04	(0.04)	0.04
Taurus	0.0%	0.02	(0.02)	0.99	(0.04)	0.04	(0.04)	0.04
AC Watson	-0.2%	0.02	(0.11)	0.92	(0.04)	0.04	(0.04)	0.04
FP1094	-0.4%	0.02	(0.19)	0.85	(0.04)	0.03	(0.04)	0.03
CDC Arras	-1.0%	0.02	(0.56)	0.58	(0.05)	0.03	(0.05)	0.03
Linola™ 989	-1.3%	0.02	(0.68)	0.50	(0.05)	0.03	(0.05)	0.03
AC Lightning	-1.4%	0.02	(0.75)	0.46	(0.05)	0.02	(0.05)	0.02
FP1096	-1.6%	0.02	(0.84)	0.40	(0.05)	0.02	(0.05)	0.02
CDC Normandy	-1.7%	0.02	(0.90)	0.37	(0.05)	0.02	(0.05)	0.02
CDC Bethune	-1.7%	0.02	(0.93)	0.36	(0.06)	0.02	(0.06)	0.02
CDC Valour	-3.4%	0.02	(1.84)	0.07	(0.07)	0.00	(0.07)	0.00

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 2 – BATTLEFORD01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.76
R Square	0.58
Adjusted R Square	0.38
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	2.95	0.00
Residual	32.00	0.01	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	17.1%	0.01	17.79	0.00	0.15	0.19	0.15	0.19
Linola™ 1084	2.0%	0.01	1.50	0.14	(0.01)	0.05	(0.01)	0.05
FP1082	1.2%	0.01	0.86	0.39	(0.02)	0.04	(0.02)	0.04
AC Carnduff	0.6%	0.01	0.46	0.65	(0.02)	0.03	(0.02)	0.03
Taurus	0.6%	0.01	0.44	0.66	(0.02)	0.03	(0.02)	0.03
AC Emerson	-1.1%	0.01	(0.81)	0.42	(0.04)	0.02	(0.04)	0.02
CDC Arras	-1.3%	0.01	(0.98)	0.34	(0.04)	0.01	(0.04)	0.01
Flanders	-1.4%	0.01	(1.07)	0.29	(0.04)	0.01	(0.04)	0.01
CDC Bethune	-1.6%	0.01	(1.19)	0.24	(0.04)	0.01	(0.04)	0.01
AC Watson	-1.8%	0.01	(1.35)	0.19	(0.05)	0.01	(0.05)	0.01
CDC Valour	-1.9%	0.01	(1.39)	0.18	(0.05)	0.01	(0.05)	0.01
FP1094	-2.1%	0.01	(1.55)	0.13	(0.05)	0.01	(0.05)	0.01
Linola™ 989	**-2.8%**	**0.01**	**(2.06)**	**0.05**	**(0.06)**	**(0.00)**	**(0.06)**	**(0.00)**
CDC Normandy	**-3.0%**	**0.01**	**(2.20)**	**0.03**	**(0.06)**	**(0.00)**	**(0.06)**	**(0.00)**
FP1096	**-3.3%**	**0.01**	**(2.40)**	**0.02**	**(0.06)**	**(0.00)**	**(0.06)**	**(0.00)**
AC Lightning	**-3.4%**	**0.01**	**(2.50)**	**0.02**	**(0.06)**	**(0.01)**	**(0.06)**	**(0.01)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 3 - CARLYLE01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.46
R Square	0.21
Adjusted R Square	(0.16)
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.00	0.00	0.56	0.89
Residual	32.00	0.02	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	14.6%	0.01	10.64	0.00	0.12	0.17	0.12	0.17
Taurus	1.6%	0.02	0.83	0.41	(0.02)	0.06	(0.02)	0.06
FP1082	1.4%	0.02	0.73	0.47	(0.03)	0.05	(0.03)	0.05
CDC Valour	0.8%	0.02	0.43	0.67	(0.03)	0.05	(0.03)	0.05
AC Watson	0.6%	0.02	0.29	0.78	(0.03)	0.05	(0.03)	0.05
AC Carnduff	0.3%	0.02	0.18	0.86	(0.04)	0.04	(0.04)	0.04
Flanders	0.3%	0.02	0.13	0.89	(0.04)	0.04	(0.04)	0.04
FP1094	0.0%	0.02	0.01	0.99	(0.04)	0.04	(0.04)	0.04
CDC Normandy	0.0%	0.02	(0.01)	0.99	(0.04)	0.04	(0.04)	0.04
Linola™ 1084	-0.1%	0.02	(0.06)	0.96	(0.04)	0.04	(0.04)	0.04
AC Emerson	-0.2%	0.02	(0.12)	0.91	(0.04)	0.04	(0.04)	0.04
Linola™ 989	-1.0%	0.02	(0.51)	0.62	(0.05)	0.03	(0.05)	0.03
CDC Bethune	-1.1%	0.02	(0.59)	0.56	(0.05)	0.03	(0.05)	0.03
CDC Arras	-1.2%	0.02	(0.61)	0.54	(0.05)	0.03	(0.05)	0.03
FP1096	-1.6%	0.02	(0.80)	0.43	(0.06)	0.02	(0.06)	0.02
AC Lightning	-2.0%	0.02	(1.05)	0.30	(0.06)	0.02	(0.06)	0.02

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 4 - GIRVIN01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.68
R Square	0.46
Adjusted R Square	0.21
Standard Error	0.03
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.02	0.00	1.81	0.08
Residual	32.00	0.02	0.00		
Total	47.00	0.04			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	11.2%	0.02	7.27	0.00	0.08	0.14	0.08	0.14
Linola™ 1084	3.2%	0.02	1.46	0.15	(0.01)	0.08	(0.01)	0.08
AC Watson	2.3%	0.02	1.04	0.31	(0.02)	0.07	(0.02)	0.07
AC Carnduff	2.2%	0.02	1.01	0.32	(0.02)	0.07	(0.02)	0.07
Taurus	1.4%	0.02	0.66	0.52	(0.03)	0.06	(0.03)	0.06
CDC Valour	1.2%	0.02	0.56	0.58	(0.03)	0.06	(0.03)	0.06
Linola™ 989	0.4%	0.02	0.18	0.86	(0.04)	0.05	(0.04)	0.05
AC Emerson	0.1%	0.02	0.05	0.96	(0.04)	0.05	(0.04)	0.05
CDC Normandy	-1.0%	0.02	(0.48)	0.63	(0.05)	0.03	(0.05)	0.03
CDC Arras	-1.2%	0.02	(0.57)	0.57	(0.06)	0.03	(0.06)	0.03
Flanders	-1.9%	0.02	(0.85)	0.40	(0.06)	0.03	(0.06)	0.03
FP1082	-1.9%	0.02	(0.88)	0.38	(0.06)	0.03	(0.06)	0.03
FP1094	-1.9%	0.02	(0.90)	0.38	(0.06)	0.02	(0.06)	0.02
AC Lightning	-2.1%	0.02	(0.95)	0.35	(0.06)	0.02	(0.06)	0.02
FP1096	-3.3%	0.02	(1.54)	0.13	(0.08)	0.01	(0.08)	0.01
CDC Bethune	-3.8%	0.02	(1.73)	0.09	(0.08)	0.01	(0.08)	0.01

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 5 - KELVINGTON01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.81
R Square	0.65
Adjusted R Square	0.49
Standard Error	0.01
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	3.97	0.00
Residual	32.00	0.01	0.00		
Total	47.00	0.01			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	8.0%	0.01	11.12	0.00	0.07	0.10	0.07	0.10
AC Carnduff	**2.2%**	**0.01**	**2.18**	**0.04**	**0.00**	**0.04**	**0.00**	**0.04**
Linola™ 1084	**2.1%**	**0.01**	**2.08**	**0.05**	**0.00**	**0.04**	**0.00**	**0.04**
Taurus	1.2%	0.01	1.12	0.27	(0.01)	0.03	(0.01)	0.03
Linola™ 989	0.8%	0.01	0.80	0.43	(0.01)	0.03	(0.01)	0.03
FP1082	0.5%	0.01	0.47	0.64	(0.02)	0.03	(0.02)	0.03
Flanders	0.4%	0.01	0.43	0.67	(0.02)	0.03	(0.02)	0.03
AC Watson	0.1%	0.01	0.14	0.89	(0.02)	0.02	(0.02)	0.02
AC Emerson	-0.7%	0.01	(0.65)	0.52	(0.03)	0.01	(0.03)	0.01
CDC Normandy	-0.7%	0.01	(0.67)	0.50	(0.03)	0.01	(0.03)	0.01
FP1094	-1.0%	0.01	(1.00)	0.32	(0.03)	0.01	(0.03)	0.01
AC Lightning	-1.3%	0.01	(1.29)	0.21	(0.03)	0.01	(0.03)	0.01
CDC Arras	-1.5%	0.01	(1.47)	0.15	(0.04)	0.01	(0.04)	0.01
CDC Valour	-1.8%	0.01	(1.78)	0.08	(0.04)	0.00	(0.04)	0.00
CDC Bethune	**-2.3%**	**0.01**	**(2.22)**	**0.03**	**(0.04)**	**(0.00)**	**(0.04)**	**(0.00)**
FP1096	**-2.4%**	**0.01**	**(2.39)**	**0.02**	**(0.05)**	**(0.00)**	**(0.05)**	**(0.00)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 6 - KERNAN01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.54
R Square	0.29
Adjusted R Square	(0.05)
Standard Error	0.01
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.00	0.00	0.86	0.61
Residual	32.00	0.01	0.00		
Total	47.00	0.01			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.8%	0.01	4.97	0.00	0.02	0.05	0.02	0.05
CDC Valour	0.9%	0.01	0.82	0.42	(0.01)	0.03	(0.01)	0.03
AC Carnduff	0.7%	0.01	0.69	0.49	(0.01)	0.03	(0.01)	0.03
AC Emerson	0.5%	0.01	0.44	0.66	(0.02)	0.03	(0.02)	0.03
Linola™ 1084	0.4%	0.01	0.33	0.74	(0.02)	0.03	(0.02)	0.03
Taurus	0.3%	0.01	0.25	0.80	(0.02)	0.02	(0.02)	0.02
FP1082	0.0%	0.01	0.03	0.98	(0.02)	0.02	(0.02)	0.02
CDC Normandy	0.0%	0.01	(0.04)	0.97	(0.02)	0.02	(0.02)	0.02
AC Watson	-0.1%	0.01	(0.09)	0.93	(0.02)	0.02	(0.02)	0.02
CDC Bethune	-0.4%	0.01	(0.40)	0.69	(0.03)	0.02	(0.03)	0.02
CDC Arras	-0.5%	0.01	(0.43)	0.67	(0.03)	0.02	(0.03)	0.02
Flanders	-0.5%	0.01	(0.47)	0.64	(0.03)	0.02	(0.03)	0.02
AC Lightning	-0.6%	0.01	(0.55)	0.59	(0.03)	0.02	(0.03)	0.02
FP1094	-0.9%	0.01	(0.84)	0.41	(0.03)	0.01	(0.03)	0.01
Linola™ 989	-1.3%	0.01	(1.17)	0.25	(0.03)	0.01	(0.03)	0.01
FP1096	-1.7%	0.01	(1.61)	0.12	(0.04)	0.00	(0.04)	0.00

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 7 - LUSELAND01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.72
R Square	0.51
Adjusted R Square	0.28
Standard Error	0.03
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.03	0.00	2.25	0.03
Residual	32.00	0.03	0.00		
Total	47.00	0.05			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	9.0%	0.02	5.42	0.00	0.06	0.12	0.06	0.12
FP1094	**5.5%**	**0.02**	**2.32**	**0.03**	**0.01**	**0.10**	**0.01**	**0.10**
AC Emerson	**5.2%**	**0.02**	**2.21**	**0.03**	**0.00**	**0.10**	**0.00**	**0.10**
AC Lightning	**5.1%**	**0.02**	**2.17**	**0.04**	**0.00**	**0.10**	**0.00**	**0.10**
CDC Normandy	4.5%	0.02	1.92	0.06	(0.00)	0.09	(0.00)	0.09
CDC Valour	4.5%	0.02	1.90	0.07	(0.00)	0.09	(0.00)	0.09
Linola™ 989	4.0%	0.02	1.70	0.10	(0.01)	0.09	(0.01)	0.09
Flanders	3.6%	0.02	1.55	0.13	(0.01)	0.08	(0.01)	0.08
CDC Bethune	3.6%	0.02	1.54	0.13	(0.01)	0.08	(0.01)	0.08
AC Watson	3.5%	0.02	1.50	0.14	(0.01)	0.08	(0.01)	0.08
CDC Arras	1.1%	0.02	0.45	0.66	(0.04)	0.06	(0.04)	0.06
AC Carnduff	1.0%	0.02	0.42	0.68	(0.04)	0.06	(0.04)	0.06
Taurus	0.8%	0.02	0.33	0.75	(0.04)	0.06	(0.04)	0.06
Linola™ 1084	-0.2%	0.02	(0.10)	0.92	(0.05)	0.05	(0.05)	0.05
FP1096	-0.9%	0.02	(0.38)	0.71	(0.06)	0.04	(0.06)	0.04
FP1082	-2.4%	0.02	(1.03)	0.31	(0.07)	0.02	(0.07)	0.02

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 8 - NIPAWIN01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.50
R Square	0.25
Adjusted R Square	(0.10)
Standard Error	0.03
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	0.72	0.74
Residual	32.00	0.03	0.00		
Total	47.00	0.04			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	19.1%	0.02	10.24	0.00	0.15	0.23	0.15	0.23
AC Carnduff	-0.6%	0.03	(0.22)	0.83	(0.06)	0.05	(0.06)	0.05
AC Watson	-1.3%	0.03	(0.49)	0.62	(0.07)	0.04	(0.07)	0.04
Linola™ 989	-1.5%	0.03	(0.55)	0.59	(0.07)	0.04	(0.07)	0.04
AC Emerson	-1.7%	0.03	(0.65)	0.52	(0.07)	0.04	(0.07)	0.04
CDC Normandy	-1.7%	0.03	(0.66)	0.51	(0.07)	0.04	(0.07)	0.04
CDC Valour	-1.9%	0.03	(0.73)	0.47	(0.07)	0.03	(0.07)	0.03
AC Lightning	-2.3%	0.03	(0.87)	0.39	(0.08)	0.03	(0.08)	0.03
Taurus	-2.9%	0.03	(1.12)	0.27	(0.08)	0.02	(0.08)	0.02
FP1096	-3.1%	0.03	(1.18)	0.25	(0.08)	0.02	(0.08)	0.02
FP1082	-3.3%	0.03	(1.26)	0.22	(0.09)	0.02	(0.09)	0.02
FP1094	-3.4%	0.03	(1.29)	0.21	(0.09)	0.02	(0.09)	0.02
CDC Arras	-3.7%	0.03	(1.42)	0.17	(0.09)	0.02	(0.09)	0.02
Flanders	-3.8%	0.03	(1.43)	0.16	(0.09)	0.02	(0.09)	0.02
Linola™ 1084	-5.1%	0.03	(1.92)	0.06	(0.10)	0.00	(0.10)	0.00
CDC Bethune	**-6.0%**	**0.03**	**(2.28)**	**0.03**	**(0.11)**	**(0.01)**	**(0.11)**	**(0.01)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 9 - ROSTHERN01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.72
R Square	0.53
Adjusted R Square	0.30
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	2.36	0.02
Residual	32.00	0.01	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	12.6%	0.01	13.60	0.00	0.11	0.15	0.11	0.15
Taurus	0.7%	0.01	0.53	0.60	(0.02)	0.03	(0.02)	0.03
AC Emerson	0.6%	0.01	0.46	0.65	(0.02)	0.03	(0.02)	0.03
Linola™ 1084	-0.7%	0.01	(0.50)	0.62	(0.03)	0.02	(0.03)	0.02
CDC Arras	-0.9%	0.01	(0.72)	0.48	(0.04)	0.02	(0.04)	0.02
CDC Bethune	-1.0%	0.01	(0.74)	0.47	(0.04)	0.02	(0.04)	0.02
CDC Valour	-1.1%	0.01	(0.83)	0.42	(0.04)	0.02	(0.04)	0.02
Flanders	-1.2%	0.01	(0.88)	0.39	(0.04)	0.02	(0.04)	0.02
AC Carnduff	-1.7%	0.01	(1.33)	0.19	(0.04)	0.01	(0.04)	0.01
AC Watson	-1.8%	0.01	(1.36)	0.18	(0.04)	0.01	(0.04)	0.01
Linola™ 989	-1.9%	0.01	(1.48)	0.15	(0.05)	0.01	(0.05)	0.01
FP1082	-2.0%	0.01	(1.54)	0.13	(0.05)	0.01	(0.05)	0.01
CDC Normandy	-2.4%	0.01	(1.80)	0.08	(0.05)	0.00	(0.05)	0.00
AC Lightning	**-3.5%**	**0.01**	**(2.68)**	**0.01**	**(0.06)**	**(0.01)**	**(0.06)**	**(0.01)**
FP1094	**-3.7%**	**0.01**	**(2.82)**	**0.01**	**(0.06)**	**(0.01)**	**(0.06)**	**(0.01)**
FP1096	**-4.2%**	**0.01**	**(3.19)**	**0.00**	**(0.07)**	**(0.02)**	**(0.07)**	**(0.02)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 10 - SHELLBROOK01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.61
R Square	0.37
Adjusted R Square	0.08
Standard Error	0.03
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	1.28	0.27
Residual	32.00	0.02	0.00		
Total	47.00	0.04			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	9.3%	0.02	6.10	0.00	0.06	0.12	0.06	0.12
AC Emerson	**5.4%**	**0.02**	**2.51**	**0.02**	**0.01**	**0.10**	**0.01**	**0.10**
Linola™ 1084	**4.7%**	**0.02**	**2.15**	**0.04**	**0.00**	**0.09**	**0.00**	**0.09**
Taurus	3.2%	0.02	1.47	0.15	(0.01)	0.08	(0.01)	0.08
Linola™ 989	2.1%	0.02	0.95	0.35	(0.02)	0.06	(0.02)	0.06
AC Carnduff	2.0%	0.02	0.93	0.36	(0.02)	0.06	(0.02)	0.06
Flanders	1.7%	0.02	0.78	0.44	(0.03)	0.06	(0.03)	0.06
AC Watson	1.7%	0.02	0.77	0.45	(0.03)	0.06	(0.03)	0.06
FP1082	1.5%	0.02	0.71	0.48	(0.03)	0.06	(0.03)	0.06
CDC Normandy	1.3%	0.02	0.58	0.56	(0.03)	0.06	(0.03)	0.06
FP1094	1.2%	0.02	0.57	0.57	(0.03)	0.06	(0.03)	0.06
FP1096	1.0%	0.02	0.46	0.65	(0.03)	0.05	(0.03)	0.05
CDC Arras	0.7%	0.02	0.32	0.75	(0.04)	0.05	(0.04)	0.05
CDC Valour	-0.2%	0.02	(0.07)	0.94	(0.05)	0.04	(0.05)	0.04
AC Lightning	-0.3%	0.02	(0.13)	0.90	(0.05)	0.04	(0.05)	0.04
CDC Bethune	-1.1%	0.02	(0.52)	0.60	(0.06)	0.03	(0.06)	0.03

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 11 - WYNYARD01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.60
R Square	0.36
Adjusted R Square	0.05
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	1.17	0.34
Residual	32.00	0.01	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	14.3%	0.01	11.42	0.00	0.12	0.17	0.12	0.17
Linola™ 989	0.8%	0.02	0.46	0.65	(0.03)	0.04	(0.03)	0.04
Linola™ 1084	0.8%	0.02	0.44	0.66	(0.03)	0.04	(0.03)	0.04
AC Emerson	0.3%	0.02	0.19	0.85	(0.03)	0.04	(0.03)	0.04
AC Carnduff	0.2%	0.02	0.09	0.93	(0.03)	0.04	(0.03)	0.04
AC Watson	0.1%	0.02	0.03	0.97	(0.04)	0.04	(0.04)	0.04
Taurus	0.1%	0.02	0.03	0.98	(0.04)	0.04	(0.04)	0.04
FP1082	-0.1%	0.02	(0.08)	0.93	(0.04)	0.03	(0.04)	0.03
Flanders	-0.4%	0.02	(0.23)	0.82	(0.04)	0.03	(0.04)	0.03
FP1094	-0.5%	0.02	(0.28)	0.78	(0.04)	0.03	(0.04)	0.03
CDC Valour	-1.1%	0.02	(0.61)	0.55	(0.05)	0.03	(0.05)	0.03
CDC Normandy	-1.7%	0.02	(0.94)	0.35	(0.05)	0.02	(0.05)	0.02
CDC Arras	-2.2%	0.02	(1.25)	0.22	(0.06)	0.01	(0.06)	0.01
CDC Bethune	-2.7%	0.02	(1.51)	0.14	(0.06)	0.01	(0.06)	0.01
AC Lightning	-2.8%	0.02	(1.57)	0.13	(0.06)	0.01	(0.06)	0.01
FP1096	-3.5%	0.02	(1.98)	0.06	(0.07)	0.00	(0.07)	0.00

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 12 - ALLFIELDS01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.20
R Square	0.04
Adjusted R Square	0.01
Standard Error	0.04
Observations	528.00

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.04	0.00	1.46	0.12
Residual	512.00	1.04	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	12.4%	0.01	15.85	0.00	0.11	0.14	0.11	0.14
Linola™ 1084	1.3%	0.01	1.19	0.24	(0.01)	0.03	(0.01)	0.03
AC Emerson	0.8%	0.01	0.73	0.46	(0.01)	0.03	(0.01)	0.03
AC Carnduff	0.7%	0.01	0.64	0.52	(0.01)	0.03	(0.01)	0.03
Taurus	0.6%	0.01	0.58	0.56	(0.02)	0.03	(0.02)	0.03
AC Watson	0.3%	0.01	0.27	0.79	(0.02)	0.02	(0.02)	0.02
Linola™ 989	-0.1%	0.01	(0.11)	0.91	(0.02)	0.02	(0.02)	0.02
Flanders	-0.2%	0.01	(0.17)	0.86	(0.02)	0.02	(0.02)	0.02
CDC Valour	-0.3%	0.01	(0.30)	0.76	(0.03)	0.02	(0.03)	0.02
FP1082	-0.4%	0.01	(0.39)	0.69	(0.03)	0.02	(0.03)	0.02
CDC Normandy	-0.6%	0.01	(0.51)	0.61	(0.03)	0.02	(0.03)	0.02
FP1094	-0.6%	0.01	(0.57)	0.57	(0.03)	0.02	(0.03)	0.02
CDC Arras	-1.1%	0.01	(0.95)	0.34	(0.03)	0.01	(0.03)	0.01
AC Lightning	-1.3%	0.01	(1.17)	0.24	(0.03)	0.01	(0.03)	0.01
CDC Bethune	-1.6%	0.01	(1.46)	0.14	(0.04)	0.01	(0.04)	0.01
FP1096	**-2.2%**	**0.01**	**(2.00)**	**0.05**	**(0.04)**	**(0.00)**	**(0.04)**	**(0.00)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 13 - ALLVARIETIES01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.86
R Square	0.73
Adjusted R Square	0.73
Standard Error	0.02
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	10.00	0.79	0.08	142.28	0.00
Residual	517.00	0.29	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	13.5%	0.00	39.56	0.00	0.13	0.14	0.13	0.14
Assiniboia	**3.7%**	**0.00**	**7.69**	**0.00**	**0.03**	**0.05**	**0.03**	**0.05**
Nipawin	**3.3%**	**0.00**	**6.79**	**0.00**	**0.02**	**0.04**	**0.02**	**0.04**
Battleford	**2.4%**	**0.00**	**4.95**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
Carlyle	**1.0%**	**0.00**	**2.09**	**0.04**	**0.00**	**0.02**	**0.00**	**0.02**
Luseland	**-2.0%**	**0.00**	**(4.23)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
Rosthern	**-2.4%**	**0.00**	**(4.97)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
Shellbrook	**-2.6%**	**0.00**	**(5.39)**	**0.00**	**(0.04)**	**(0.02)**	**(0.04)**	**(0.02)**
Girvin	**-2.7%**	**0.00**	**(5.59)**	**0.00**	**(0.04)**	**(0.02)**	**(0.04)**	**(0.02)**
Kelvington	**-5.7%**	**0.00**	**(11.83)**	**0.00**	**(0.07)**	**(0.05)**	**(0.07)**	**(0.05)**
Kernen	**-9.9%**	**0.00**	**(20.54)**	**0.00**	**(0.11)**	**(0.09)**	**(0.11)**	**(0.09)**

NOTE: Wynyard was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 14 - ALLFIELDS01 & ALLVARIETIES01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.70
R Square	0.49
Adjusted R Square	0.48
Standard Error	0.03
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16.00	0.53	0.03	31.06	4.83E-65
Residual	511.00	0.55	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	10.9%	0.00	35.65	0.00	0.10	0.11	0.10	0.11
Assiniboia	**7.3%**	**0.01**	**14.49**	**0.00**	**0.06**	**0.08**	**0.06**	**0.08**
Nipawin	**6.9%**	**0.01**	**13.63**	**0.00**	**0.06**	**0.08**	**0.06**	**0.08**
Battleford	**6.0%**	**0.01**	**11.88**	**0.00**	**0.05**	**0.07**	**0.05**	**0.07**
Carlyle	**4.6%**	**0.01**	**9.15**	**0.00**	**0.04**	**0.06**	**0.04**	**0.06**
Taurus	-0.1%	0.01	(0.11)	0.92	(0.01)	0.01	(0.01)	0.01
AC Watson	-0.4%	0.01	(0.65)	0.52	(0.02)	0.01	(0.02)	0.01
Linola™ 989	-0.8%	0.01	(1.31)	0.19	(0.02)	0.00	(0.02)	0.00
Flanders	-0.9%	0.01	(1.41)	0.16	(0.02)	0.00	(0.02)	0.00
CDC Valour	-1.0%	0.01	(1.64)	0.10	(0.02)	0.00	(0.02)	0.00
FP1082	-1.1%	0.01	(1.80)	0.07	(0.02)	0.00	(0.02)	0.00
CDC Normandy	**-1.3%**	**0.01**	**(2.00)**	**0.05**	**(0.03)**	**(0.00)**	**(0.03)**	**(0.00)**
FP1094	**-1.3%**	**0.01**	**(2.10)**	**0.04**	**(0.03)**	**(0.00)**	**(0.03)**	**(0.00)**
CDC Arras	**-1.8%**	**0.01**	**(2.77)**	**0.01**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
AC Lightning	**-2.0%**	**0.01**	**(3.15)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
CDC Bethune	**-2.3%**	**0.01**	**(3.66)**	**0.00**	**(0.04)**	**(0.01)**	**(0.04)**	**(0.01)**
FP1096	**-2.9%**	**0.01**	**(4.58)**	**0.00**	**(0.04)**	**(0.02)**	**(0.04)**	**(0.02)**

NOTE: Wynyard and Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level. Due to constraints in the Excel regression function, only 16 explanatory variables could be used. Explanatory variables that were excluded were the varieties Linola 1084, AC Carnduff, AC Emerson and the locations Luseland, Rosthern, Shellbrook, Girvin, Kelvington and Kernen.

Equation 15 - ALLFIELDS01 & ALLVARIETIES01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.70
R Square	0.49
Adjusted R Square	0.48
Standard Error	0.03
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16.00	0.53	0.03	30.83	0.00
Residual	511.00	0.55	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	9.2%	0.00	30.01	0.00	0.09	0.10	0.09	0.10
Assiniboia	**7.3%**	**0.01**	**14.47**	**0.00**	**0.06**	**0.08**	**0.06**	**0.08**
Nipawin	**6.9%**	**0.01**	**13.61**	**0.00**	**0.06**	**0.08**	**0.06**	**0.08**
Battleford	**6.0%**	**0.01**	**11.86**	**0.00**	**0.05**	**0.07**	**0.05**	**0.07**
Carlyle	**4.6%**	**0.01**	**9.13**	**0.00**	**0.04**	**0.06**	**0.04**	**0.06**
Linola™ 1084	**2.3%**	**0.01**	**3.62**	**0.00**	**0.01**	**0.04**	**0.01**	**0.04**
AC Emerson	**1.8%**	**0.01**	**2.83**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
AC Carnduff	**1.7%**	**0.01**	**2.67**	**0.01**	**0.00**	**0.03**	**0.00**	**0.03**
Taurus	**1.6%**	**0.01**	**2.56**	**0.01**	**0.00**	**0.03**	**0.00**	**0.03**
AC Watson	**1.3%**	**0.01**	**2.02**	**0.04**	**0.00**	**0.03**	**0.00**	**0.03**
Linola™ 989	0.9%	0.01	1.36	0.17	(0.00)	0.02	(0.00)	0.02
Flanders	0.8%	0.01	1.26	0.21	(0.00)	0.02	(0.00)	0.02
CDC Valour	0.7%	0.01	1.03	0.30	(0.01)	0.02	(0.01)	0.02
FP1082	0.6%	0.01	0.87	0.38	(0.01)	0.02	(0.01)	0.02
CDC Normandy	0.4%	0.01	0.67	0.50	(0.01)	0.02	(0.01)	0.02
FP1094	0.4%	0.01	0.57	0.57	(0.01)	0.02	(0.01)	0.02
FP1096	-1.2%	0.01	(1.91)	0.06	(0.02)	0.00	(0.02)	0.00

NOTE: Wynyard and Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level. Due to constraints in the Excel regression function, only 16 explanatory variables could be used. Explanatory variables that were excluded were the varieties CDC Arras, AC Lightening, and CDC Bethune and the locations Luseland, Rosthern, Shellbrook, Girvin, Kelvington and Kernen.

Equation 16 - ALLFIELDS01 & ALLVARIETIES01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.85
R Square	0.73
Adjusted R Square	0.72
Standard Error	0.02
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16.00	0.79	0.05	85.14	0.00
Residual	511.00	0.29	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	16.4%	0.00	79.81	0.00	0.16	0.17	0.16	0.17
AC Watson	-0.3%	0.00	(0.58)	0.56	(0.01)	0.01	(0.01)	0.01
Flanders	-0.7%	0.00	(1.66)	0.10	(0.02)	0.00	(0.02)	0.00
CDC Valour	-0.9%	0.00	(1.99)	0.05	(0.02)	(0.00)	(0.02)	(0.00)
FP1082	**-1.0%**	**0.00**	**(2.21)**	**0.03**	**(0.02)**	**(0.00)**	**(0.02)**	**(0.00)**
CDC Normandy	**-1.1%**	**0.00**	**(2.49)**	**0.01**	**(0.02)**	**(0.00)**	**(0.02)**	**(0.00)**
FP1094	**-1.2%**	**0.00**	**(2.64)**	**0.01**	**(0.02)**	**(0.00)**	**(0.02)**	**(0.00)**
CDC Arras	**-1.6%**	**0.00**	**(3.58)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
AC Lightning	**-1.9%**	**0.00**	**(4.12)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
CDC Bethune	**-2.2%**	**0.00**	**(4.83)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**
FP1096	**-2.8%**	**0.00**	**(6.14)**	**0.00**	**(0.04)**	**(0.02)**	**(0.04)**	**(0.02)**
Luseland	**-4.1%**	**0.00**	**(10.83)**	**0.00**	**(0.05)**	**(0.03)**	**(0.05)**	**(0.03)**
Rosthern	**-4.5%**	**0.00**	**(11.76)**	**0.00**	**(0.05)**	**(0.04)**	**(0.05)**	**(0.04)**
Shellbrook	**-4.7%**	**0.00**	**(12.29)**	**0.00**	**(0.05)**	**(0.04)**	**(0.05)**	**(0.04)**
Girvin	**-4.8%**	**0.00**	**(12.55)**	**0.00**	**(0.06)**	**(0.04)**	**(0.06)**	**(0.04)**
Kelvington	**-7.8%**	**0.00**	**(20.47)**	**0.00**	**(0.09)**	**(0.07)**	**(0.09)**	**(0.07)**
Kernen	**-12.0%**	**0.00**	**(31.52)**	**0.00**	**(0.13)**	**(0.11)**	**(0.13)**	**(0.11)**

NOTE: Wynyard and Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level. Due to constraints in the Excel regression function, only 16 explanatory variables could be used. Explanatory variables that were excluded were the varieties Linola 1084, AC Carnduff and AC Emerson and the locations Assiniboia, Nipawin, Battleford and Carlyle.

Equation 17 - ALLFIELDS01 & ALLVARIETIES01 Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.85
R Square	0.72
Adjusted R Square	0.71
Standard Error	0.02
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16.00	0.77	0.05	80.72	0.00
Residual	511.00	0.31	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	15.0%	0.00	71.50	0.00	0.15	0.15	0.15	0.15
Linola™ 1084	**2.2%**	**0.00**	**4.73**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
AC Emerson	**1.7%**	**0.00**	**3.64**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
AC Carnduff	**1.6%**	**0.00**	**3.41**	**0.00**	**0.01**	**0.02**	**0.01**	**0.02**
Taurus	**1.5%**	**0.00**	**3.27**	**0.00**	**0.01**	**0.02**	**0.01**	**0.02**
Linola™ 989	0.7%	0.00	1.60	0.11	(0.00)	0.02	(0.00)	0.02
Flanders	0.7%	0.00	1.46	0.14	(0.00)	0.02	(0.00)	0.02
FP1082	0.4%	0.00	0.92	0.36	(0.00)	0.01	(0.00)	0.01
CDC Normandy	0.3%	0.00	0.65	0.52	(0.01)	0.01	(0.01)	0.01
FP1094	0.2%	0.00	0.50	0.62	(0.01)	0.01	(0.01)	0.01
CDC Arras	-0.2%	0.00	(0.42)	0.68	(0.01)	0.01	(0.01)	0.01
Luseland	**-4.1%**	**0.00**	**(10.62)**	**0.00**	**(0.05)**	**(0.03)**	**(0.05)**	**(0.03)**
Rosthern	**-4.5%**	**0.00**	**(11.54)**	**0.00**	**(0.05)**	**(0.04)**	**(0.05)**	**(0.04)**
Shellbrook	**-4.7%**	**0.00**	**(12.06)**	**0.00**	**(0.05)**	**(0.04)**	**(0.05)**	**(0.04)**
Girvin	**-4.8%**	**0.00**	**(12.31)**	**0.00**	**(0.06)**	**(0.04)**	**(0.06)**	**(0.04)**
Kelvington	**-7.8%**	**0.00**	**(20.08)**	**0.00**	**(0.09)**	**(0.07)**	**(0.09)**	**(0.07)**
Kernen	**-12.0%**	**0.00**	**(30.92)**	**0.00**	**(0.13)**	**(0.11)**	**(0.13)**	**(0.11)**

NOTE: Wynyard and Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level. Due to constraints in the Excel regression function, only 16 explanatory variables could be used. Explanatory variables that were excluded were the varieties CDC Arras, AC Lightening and CDC Bethune and the locations Assiniboia, Battleford and Carlyle.

Equation 18 - High Yielding Fields(Assiniboia, Battleford, Carlyle, Nipawin, Wynyard)Adj. Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.39
R Square	0.15
Adjusted R Square	0.10
Standard Error	0.02
Observations	240.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.03	0.00	2.74	0.00
Residual	224.00	0.14	0.00		
Total	239.00	0.16			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	16.5%	0.01	25.84	0.00	0.15	0.18	0.15	0.18
Linola™ 1084	1.0%	0.01	1.12	0.27	(0.01)	0.03	(0.01)	0.03
AC Carnduff	0.3%	0.01	0.30	0.76	(0.02)	0.02	(0.02)	0.02
Taurus	-0.1%	0.01	(0.10)	0.92	(0.02)	0.02	(0.02)	0.02
FP1082	-0.1%	0.01	(0.11)	0.91	(0.02)	0.02	(0.02)	0.02
AC Emerson	-0.4%	0.01	(0.49)	0.63	(0.02)	0.01	(0.02)	0.01
AC Watson	-0.5%	0.01	(0.54)	0.59	(0.02)	0.01	(0.02)	0.01
Flanders	-0.9%	0.01	(0.96)	0.34	(0.03)	0.01	(0.03)	0.01
Linola™ 989	-1.1%	0.01	(1.20)	0.23	(0.03)	0.01	(0.03)	0.01
FP1094	-1.2%	0.01	(1.34)	0.18	(0.03)	0.01	(0.03)	0.01
CDC Valour	-1.4%	0.01	(1.60)	0.11	(0.03)	0.00	(0.03)	0.00
CDC Normandy	-1.6%	0.01	(1.73)	0.08	(0.03)	0.00	(0.03)	0.00
CDC Arras	**-1.8%**	**0.01**	**(2.04)**	**0.04**	**(0.04)**	**(0.00)**	**(0.04)**	**(0.00)**
AC Lightning	**-2.3%**	**0.01**	**(2.57)**	**0.01**	**(0.04)**	**(0.01)**	**(0.04)**	**(0.01)**
FP1096	**-2.5%**	**0.01**	**(2.82)**	**0.01**	**(0.04)**	**(0.01)**	**(0.04)**	**(0.01)**
CDC Bethune	**-2.6%**	**0.01**	**(2.85)**	**0.00**	**(0.04)**	**(0.01)**	**(0.04)**	**(0.01)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 19 - All Varieties (but only Assiniboia, Battleford, Carlyle, Nipawin, Wynyard) Adj. Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.53
R Square	0.29
Adjusted R Square	0.27
Standard Error	0.02
Observations	240.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4.00	0.05	0.01	23.44	0.00
Residual	235.00	0.12	0.00		
Total	239.00	0.16			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	13.5%	0.00	42.03	0.00	0.13	0.14	0.13	0.14
Assiniboia	**3.7%**	**0.00**	**8.17**	**0.00**	**0.03**	**0.05**	**0.03**	**0.05**
Nipawin	**3.3%**	**0.00**	**7.22**	**0.00**	**0.02**	**0.04**	**0.02**	**0.04**
Battleford	**2.4%**	**0.00**	**5.26**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
Carlyle	**1.0%**	**0.00**	**2.22**	**0.03**	**0.00**	**0.02**	**0.00**	**0.02**

NOTE: Wynyard was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 20 - Crop Production Area 1 (Assiniboia) Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.53
R Square	0.29
Adjusted R Square	(0.05)
Standard Error	0.02
Observations	48.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.01	0.00	0.85	0.62
Residual	32.00	0.02	0.00		
Total	47.00	0.02			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	17.8%	0.01	13.48	0.00	0.15	0.20	0.15	0.20
Linola™ 1084	1.5%	0.02	0.79	0.44	(0.02)	0.05	(0.02)	0.05
Flanders	0.8%	0.02	0.40	0.69	(0.03)	0.05	(0.03)	0.05
AC Carnduff	0.5%	0.02	0.29	0.77	(0.03)	0.04	(0.03)	0.04
AC Emerson	0.2%	0.02	0.12	0.91	(0.04)	0.04	(0.04)	0.04
FP1082	0.1%	0.02	0.06	0.95	(0.04)	0.04	(0.04)	0.04
Taurus	0.0%	0.02	(0.02)	0.99	(0.04)	0.04	(0.04)	0.04
AC Watson	-0.2%	0.02	(0.11)	0.92	(0.04)	0.04	(0.04)	0.04
FP1094	-0.4%	0.02	(0.19)	0.85	(0.04)	0.03	(0.04)	0.03
CDC Arras	-1.0%	0.02	(0.56)	0.58	(0.05)	0.03	(0.05)	0.03
Linola™ 989	-1.3%	0.02	(0.68)	0.50	(0.05)	0.03	(0.05)	0.03
AC Lightning	-1.4%	0.02	(0.75)	0.46	(0.05)	0.02	(0.05)	0.02
FP1096	-1.6%	0.02	(0.84)	0.40	(0.05)	0.02	(0.05)	0.02
CDC Normandy	-1.7%	0.02	(0.90)	0.37	(0.05)	0.02	(0.05)	0.02
CDC Bethune	-1.7%	0.02	(0.93)	0.36	(0.06)	0.02	(0.06)	0.02
CDC Valour	-3.4%	0.02	(1.84)	0.07	(0.07)	0.00	(0.07)	0.00

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 21 - Crop Production Area 2 (Carlyle, Girvin, Kelvington, Luseland) Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.20
R Square	0.04
Adjusted R Square	(0.04)
Standard Error	0.05
Observations	192.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.02	0.00	0.47	0.95
Residual	176.00	0.42	0.00		
Total	191.00	0.43			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	9.7%	0.01	6.86	0.00	0.07	0.12	0.07	0.12
CDC Valour	1.8%	0.02	0.93	0.35	(0.02)	0.06	(0.02)	0.06
AC Watson	1.6%	0.02	0.79	0.43	(0.02)	0.05	(0.02)	0.05
AC Emerson	1.4%	0.02	0.70	0.49	(0.03)	0.05	(0.03)	0.05
AC Camduff	1.1%	0.02	0.54	0.59	(0.03)	0.05	(0.03)	0.05
Taurus	1.0%	0.02	0.51	0.61	(0.03)	0.05	(0.03)	0.05
CDC Normandy	0.8%	0.02	0.43	0.67	(0.03)	0.05	(0.03)	0.05
Linola™ 1084	0.8%	0.02	0.40	0.69	(0.03)	0.05	(0.03)	0.05
FP1094	0.7%	0.02	0.33	0.74	(0.03)	0.05	(0.03)	0.05
Linola™ 989	0.5%	0.02	0.27	0.79	(0.03)	0.04	(0.03)	0.04
Flanders	0.4%	0.02	0.19	0.85	(0.04)	0.04	(0.04)	0.04
AC Lightning	0.1%	0.02	0.05	0.96	(0.04)	0.04	(0.04)	0.04
CDC Bethune	-0.4%	0.02	(0.22)	0.83	(0.04)	0.03	(0.04)	0.03
CDC Arras	-0.5%	0.02	(0.23)	0.82	(0.04)	0.03	(0.04)	0.03
FP1082	-0.7%	0.02	(0.36)	0.72	(0.05)	0.03	(0.05)	0.03
FP1096	-1.9%	0.02	(0.95)	0.35	(0.06)	0.02	(0.06)	0.02

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 22 - Crop Production Area 3 (Battleford, Rosthern, Wynyard) Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.42
R Square	0.18
Adjusted R Square	0.08
Standard Error	0.03
Observations	144.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.02	0.00	1.88	0.03
Residual	128.00	0.10	0.00		
Total	143.00	0.12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	14.7%	0.01	16.10	0.00	0.13	0.16	0.13	0.16
Linola™ 1084	0.7%	0.01	0.56	0.58	(0.02)	0.03	(0.02)	0.03
Taurus	0.4%	0.01	0.35	0.73	(0.02)	0.03	(0.02)	0.03
AC Emerson	-0.1%	0.01	(0.04)	0.97	(0.03)	0.02	(0.03)	0.02
AC Carnduff	-0.3%	0.01	(0.25)	0.80	(0.03)	0.02	(0.03)	0.02
FP1082	-0.3%	0.01	(0.26)	0.80	(0.03)	0.02	(0.03)	0.02
Flanders	-1.0%	0.01	(0.78)	0.44	(0.04)	0.02	(0.04)	0.02
AC Watson	-1.2%	0.01	(0.92)	0.36	(0.04)	0.01	(0.04)	0.01
Linola™ 989	-1.3%	0.01	(1.02)	0.31	(0.04)	0.01	(0.04)	0.01
CDC Valour	-1.3%	0.01	(1.04)	0.30	(0.04)	0.01	(0.04)	0.01
CDC Arras	-1.5%	0.01	(1.16)	0.25	(0.04)	0.01	(0.04)	0.01
CDC Bethune	-1.8%	0.01	(1.36)	0.18	(0.04)	0.01	(0.04)	0.01
FP1094	-2.1%	0.01	(1.63)	0.11	(0.05)	0.00	(0.05)	0.00
CDC Normandy	-2.3%	0.01	(1.82)	0.07	(0.05)	0.00	(0.05)	0.00
AC Lightning	**-3.2%**	**0.01**	**(2.51)**	**0.01**	**(0.06)**	**(0.01)**	**(0.06)**	**(0.01)**
FP1096	**-3.6%**	**0.01**	**(2.83)**	**0.01**	**(0.06)**	**(0.01)**	**(0.06)**	**(0.01)**

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 23 - Crop Production Area 4 (Kelvington, Nipawin, Shellbrook) Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.30
R Square	0.09
Adjusted R Square	(0.02)
Standard Error	0.04
Observations	144.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	0.02	0.00	0.82	0.66
Residual	128.00	0.25	0.00		
Total	143.00	0.27			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	12.1%	0.01	8.17	0.00	0.09	0.15	0.09	0.15
Linola™ 1084	2.6%	0.02	1.22	0.22	(0.02)	0.07	(0.02)	0.07
AC Carnduff	1.3%	0.02	0.63	0.53	(0.03)	0.05	(0.03)	0.05
AC Emerson	1.1%	0.02	0.53	0.60	(0.03)	0.05	(0.03)	0.05
Linola™ 989	0.6%	0.02	0.27	0.79	(0.04)	0.05	(0.04)	0.05
Taurus	0.6%	0.02	0.27	0.79	(0.04)	0.05	(0.04)	0.05
AC Watson	0.3%	0.02	0.13	0.90	(0.04)	0.04	(0.04)	0.04
CDC Normandy	-0.3%	0.02	(0.14)	0.89	(0.04)	0.04	(0.04)	0.04
FP1082	-0.3%	0.02	(0.16)	0.87	(0.04)	0.04	(0.04)	0.04
Flanders	-0.5%	0.02	(0.22)	0.83	(0.05)	0.04	(0.05)	0.04
FP1094	-1.0%	0.02	(0.46)	0.64	(0.05)	0.03	(0.05)	0.03
AC Lightning	-1.2%	0.02	(0.58)	0.56	(0.05)	0.03	(0.05)	0.03
CDC Valour	-1.2%	0.02	(0.58)	0.56	(0.05)	0.03	(0.05)	0.03
CDC Arras	-1.4%	0.02	(0.68)	0.50	(0.06)	0.03	(0.06)	0.03
FP1096	-1.4%	0.02	(0.68)	0.50	(0.06)	0.03	(0.06)	0.03
CDC Bethune	-3.0%	0.02	(1.46)	0.15	(0.07)	0.01	(0.07)	0.01

NOTE: Vimy was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 24 - All Crop Production Areas Adjusted Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.46
R Square	0.21
Adjusted R Square	0.21
Standard Error	0.04
Observations	528.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3.00	0.23	0.08	47.62	0.00
Residual	524.00	0.85	0.00		
Total	527.00	1.08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	11.8%	0.00	35.18	0.00	0.11	0.12	0.11	0.12
Production Area 1	**5.4%**	**0.01**	**8.02**	**0.00**	**0.04**	**0.07**	**0.04**	**0.07**
Production Area 3	**1.7%**	**0.00**	**3.52**	**0.00**	**0.01**	**0.03**	**0.01**	**0.03**
Production Area 2	**-1.7%**	**0.00**	**(3.90)**	**0.00**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.01)**

NOTE: Production Area 4 was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

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Equation 25 - BRANDON01 & MCDUFF Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.27
R Square	0.08
Adjusted R Square	(0.02)
Standard Error	0.02
Observations	53.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	5.00	0.00	0.77	0.58
Residual	47.00	0.00		
Total	52.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	**Upper 95.0%**
Intercept	17.0%	23.17	0.00	0.16	0.18	0.16	0.18
67 kg/ha	0.7%	0.95	0.35	(0.01)	0.02	(0.01)	0.02
67%N	0.4%	0.53	0.60	(0.01)	0.02	(0.01)	0.02
22 kg/ha	-0.1%	(0.11)	0.92	(0.02)	0.01	(0.02)	0.01
Early Seeding	-0.3%	(0.53)	0.60	(0.02)	0.01	(0.02)	0.01
133%N	-0.7%	(0.92)	0.36	(0.02)	0.01	(0.02)	0.01

NOTE: 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 26 - INDIAN HEAD01 Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.56
R Square	0.32
Adjusted R Square	0.29
Standard Error	0.02
Observations	162.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	7.00	0.01	10.28	0.00
Residual	154.00	0.00		
Total	161.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	10.8%	21.69	0.00	0.10	0.12	0.10	0.12
67%N	0.4%	0.84	0.40	(0.00)	0.01	(0.00)	0.01
67 kg/ha	0.3%	0.66	0.51	(0.01)	0.01	(0.01)	0.01
133%N	-0.5%	(1.26)	0.21	(0.01)	0.00	(0.01)	0.00
Norlin	-0.6%	(1.28)	0.20	(0.01)	0.00	(0.01)	0.00
22 kg/ha	-0.6%	(1.50)	0.14	(0.02)	0.00	(0.02)	0.00
McDuff	**-1.6%**	**(3.66)**	**0.00**	**(0.02)**	**(0.01)**	**(0.02)**	**(0.01)**
Early Seeding	**-2.5%**	**(6.99)**	**0.00**	**(0.03)**	**(0.02)**	**(0.03)**	**(0.02)**

NOTE: Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 27 - MELFORT01 Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.66
R Square	0.43
Adjusted R Square	0.40
Standard Error	0.02
Observations	162.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	7.00	0.01	16.59	0.00
Residual	154.00	0.00		
Total	161.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	14.9%	38.06	0.00	0.14	0.16	0.14	0.16
Norlin	**1.4%**	**4.04**	**0.00**	**0.01**	**0.02**	**0.01**	**0.02**
McDuff	0.7%	1.92	0.06	(0.00)	0.01	(0.00)	0.01
67%N	0.5%	1.38	0.17	(0.00)	0.01	(0.00)	0.01
67 kg/ha	0.4%	1.11	0.27	(0.00)	0.01	(0.00)	0.01
133%N	-0.6%	(1.71)	0.09	(0.01)	0.00	(0.01)	0.00
22 kg/ha	**-1.5%**	**(4.39)**	**0.00**	**(0.02)**	**(0.01)**	**(0.02)**	**(0.01)**
Early Seeding	**-2.1%**	**(7.51)**	**0.00**	**(0.03)**	**(0.02)**	**(0.03)**	**(0.02)**

NOTE: Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 28 - MORDEN01 Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.81
R Square	0.65
Adjusted R Square	0.64
Standard Error	0.02
Observations	154.00

ANOVA	df	MS	F	Significance F
Regression	7.00	0.01	39.30	0.00
Residual	146.00	0.00		
Total	153.00			

	Coefficients	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	12.7%	31.71	0.00	0.12	0.14	0.12	0.14
Early Seeding	**4.3%**	**16.05**	**0.00**	**0.04**	**0.05**	**0.04**	**0.05**
67 kg/ha	0.4%	1.05	0.30	(0.00)	0.01	(0.00)	0.01
133%N	0.1%	0.44	0.66	(0.01)	0.01	(0.01)	0.01
67%N	0.0%	0.07	0.94	(0.01)	0.01	(0.01)	0.01
Norlin	-0.3%	(0.86)	0.39	(0.01)	0.00	(0.01)	0.00
McDuff	-0.3%	(1.01)	0.31	(0.01)	0.00	(0.01)	0.00
22 kg/ha	**-0.7%**	**(2.09)**	**0.04**	**(0.01)**	**(0.00)**	**(0.01)**	**(0.00)**

NOTE: Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 29 - AGCAN01 Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.77
R Square	0.59
Adjusted R Square	0.59
Standard Error	0.02
Observations	531.00

ANOVA

	df	*MS*	*F*	**Significance F**
Regression	10.00	0.05	76.35	0.00
Residual	520.00	0.00		
Total	530.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	17.7%	35.32	0.00	0.17	0.19	0.17	0.19
67 kg/ha	0.4%	1.42	0.16	(0.00)	0.01	(0.00)	0.01
67%N	0.3%	1.03	0.30	(0.00)	0.01	(0.00)	0.01
Norlin	0.1%	0.34	0.73	(0.00)	0.01	(0.00)	0.01
Early Seeding	-0.2%	(0.75)	0.45	(0.01)	0.00	(0.01)	0.00
133%N	-0.4%	(1.45)	0.15	(0.01)	0.00	(0.01)	0.00
McDuff	-0.5%	(1.81)	0.07	(0.01)	0.00	(0.01)	0.00
22 kg/ha	**-0.9%**	**(3.40)**	**0.00**	**(0.01)**	**(0.00)**	**(0.01)**	**(0.00)**
Morden	**-2.6%**	**(6.15)**	**0.00**	**(0.03)**	**(0.02)**	**(0.03)**	**(0.02)**
Melfort	**-3.2%**	**(7.49)**	**0.00**	**(0.04)**	**(0.02)**	**(0.04)**	**(0.02)**
Indian Head	**-8.6%**	**(20.35)**	**0.00**	**(0.09)**	**(0.08)**	**(0.09)**	**(0.08)**

NOTE: Brandon, Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 30 - MELFORT01 Fiber Yield (kg/ha) = f()

Regression Statistics	
Multiple R	0.75
R Square	0.56
Adjusted R Square	0.54
Standard Error	27.34
Observations	162.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	7.00	21,020.48	28.12	0.00
Residual	154.00	747.43		
Total	161.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	172.85	28.45	0.00	160.85	184.85	160.85	184.85
Norlin	**24.97**	**4.75**	**0.00**	**14.57**	**35.36**	**14.57**	**35.36**
McDuff	**15.61**	**2.97**	**0.00**	**5.21**	**26.00**	**5.21**	**26.00**
67 kg/ha	7.01	1.33	0.18	(3.38)	17.41	(3.38)	17.41
67%N	3.65	0.69	0.49	(6.74)	14.04	(6.74)	14.04
133%N	**(10.81)**	**(2.05)**	**0.04**	**(21.20)**	**(0.41)**	**(21.20)**	**(0.41)**
22 kg/ha	**(26.41)**	**(5.02)**	**0.00**	**(36.81)**	**(16.02)**	**(36.81)**	**(16.02)**
Early Seeding	**(47.22)**	**(10.99)**	**0.00**	**(55.71)**	**(38.73)**	**(55.71)**	**(38.73)**

NOTE: Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 31 - MELFORT01 Stem Count = f()

Regression Statistics	
Multiple R	0.88
R Square	0.77
Adjusted R Square	0.76
Standard Error	96.99
Observations	162.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	7.00	697,625.02	74.15	0.00
Residual	154.00	9,407.84		
Total	161.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	524.78	24.35	0.00	482.20	567.36	482.20	567.36
67 kg/ha	**159.13**	**8.52**	**0.00**	**122.25**	**196.01**	**122.25**	**196.01**
McDuff	**103.78**	**5.56**	**0.00**	**66.90**	**140.65**	**66.90**	**140.65**
67%N	35.41	1.90	0.06	(1.47)	72.28	(1.47)	72.28
Norlin	31.28	1.68	0.10	(5.60)	68.15	(5.60)	68.15
133%N	**(59.91)**	**(3.21)**	**0.00**	**(96.78)**	**(23.03)**	**(96.78)**	**(23.03)**
Early Seeding	**(168.75)**	**(11.07)**	**0.00**	**(198.86)**	**(138.64)**	**(198.86)**	**(138.64)**
22 kg/ha	**(183.41)**	**(9.83)**	**0.00**	**(220.28)**	**(146.53)**	**(220.28)**	**(146.53)**

NOTE: Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level

Equation 32 - MORDEN01, MELFORT01, INDIAN HEAD01 Fiber % of Unretted Straw = f()

Regression Statistics	
Multiple R	0.75
R Square	0.56
Adjusted R Square	0.55
Standard Error	0.03
Observations	478.00

ANOVA

	df	*MS*	*F*	*Significance F*
Regression	9.00	0.04	65.53	0.00
Residual	468.00	0.00		
Total	477.00			

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	14.6%	40.04	0.00	0.14	0.15	0.14	0.15
Morden	**0.6%**	**2.00**	**0.05**	**0.00**	**0.01**	**0.00**	**0.01**
67 kg/ha	0.3%	1.21	0.23	(0.00)	0.01	(0.00)	0.01
67%N	0.3%	0.91	0.36	(0.00)	0.01	(0.00)	0.01
Norlin	0.1%	0.33	0.74	(0.00)	0.01	(0.00)	0.01
Early Seeding	-0.1%	(0.63)	0.53	(0.01)	0.00	(0.01)	0.00
133%N	-0.3%	(1.24)	0.22	(0.01)	0.00	(0.01)	0.00
McDuff	-0.5%	(1.79)	0.07	(0.01)	0.00	(0.01)	0.00
22 kg/ha	**-1.0%**	**(3.50)**	**0.00**	**(0.02)**	**(0.00)**	**(0.02)**	**(0.00)**
Indian Head	**-5.4%**	**(19.49)**	**0.00**	**(0.06)**	**(0.05)**	**(0.06)**	**(0.05)**

NOTE: Melfort, Valour, 45 kg/ha, 100%N and Late Seeding was the intercept term; a text line in **bold** indicated the results are statistically different at the 95% confidence level